From Nonlinear Effects to Asymmetric Autocatalysis: The 2026 Nobel Prize in Chemistry

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Chemistry Seminar on the topic of 2026 Nobel Prize in Chemistry

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Schrenk

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Abstract: The 2026 Nobel Prize in Chemistry recognizes Henri B. Kagan and Kenso Soai for their pioneering discoveries of nonlinear effects and asymmetric autocatalysis in organic synthesis. Their work has fundamentally advanced our understanding of how molecular chirality can influence catalytic reactivity and how small initial enantiomeric imbalances can be amplified. Kagan's discovery of nonlinear effects revealed that the relationship between catalyst enantiomeric excess and product enantiomeric excess is not necessarily linear. These observations challenged conventional assumptions about asymmetric catalysis and established nonlinear effects as a valuable tool for investigating catalyst aggregation, the nature of active catalytic species, and reaction mechanisms. Soai's discovery of asymmetric autocatalysis demonstrated that a chiral reaction product can catalyze its own formation, enabling remarkable amplification of enantiomeric excess through positive feedback. This finding provided an experimental demonstration of how a small initial chiral imbalance can develop into a highly enantioenriched chemical system, offering important insights into the possible origins of biological homochirality. Together, these discoveries have expanded our understanding of asymmetric catalysis and the fundamental relationship between molecular chirality, catalytic mechanisms, and chemical evolution. This seminar will explore the scientific principles, mechanistic insights, and broader implications of these Nobel Prize-winning discoveries.

About the speaker: **Dr. En-Chih Liu** is an Assistant Professor of Chemistry at Missouri University of Science and Technology. He received his Ph.D. in Chemistry from the University of Minnesota in 2021, where his research focused on asymmetric catalysis. Following his doctoral studies, he conducted postdoctoral research at the University of Michigan and Texas A&M University, where he gained extensive experience in synthetic organic chemistry, electrochemistry, and photochemistry. In August 2025, he joined Missouri S&T as an Assistant Professor. His research group focuses on the development of new synthetic methodologies and asymmetric catalysis using electrochemical and photochemical approaches.